

Experimental Test of an Expedient Terrorist Vehicle Barrier



A Laboratory Directed Research and Development Feasibility Study

October 1998

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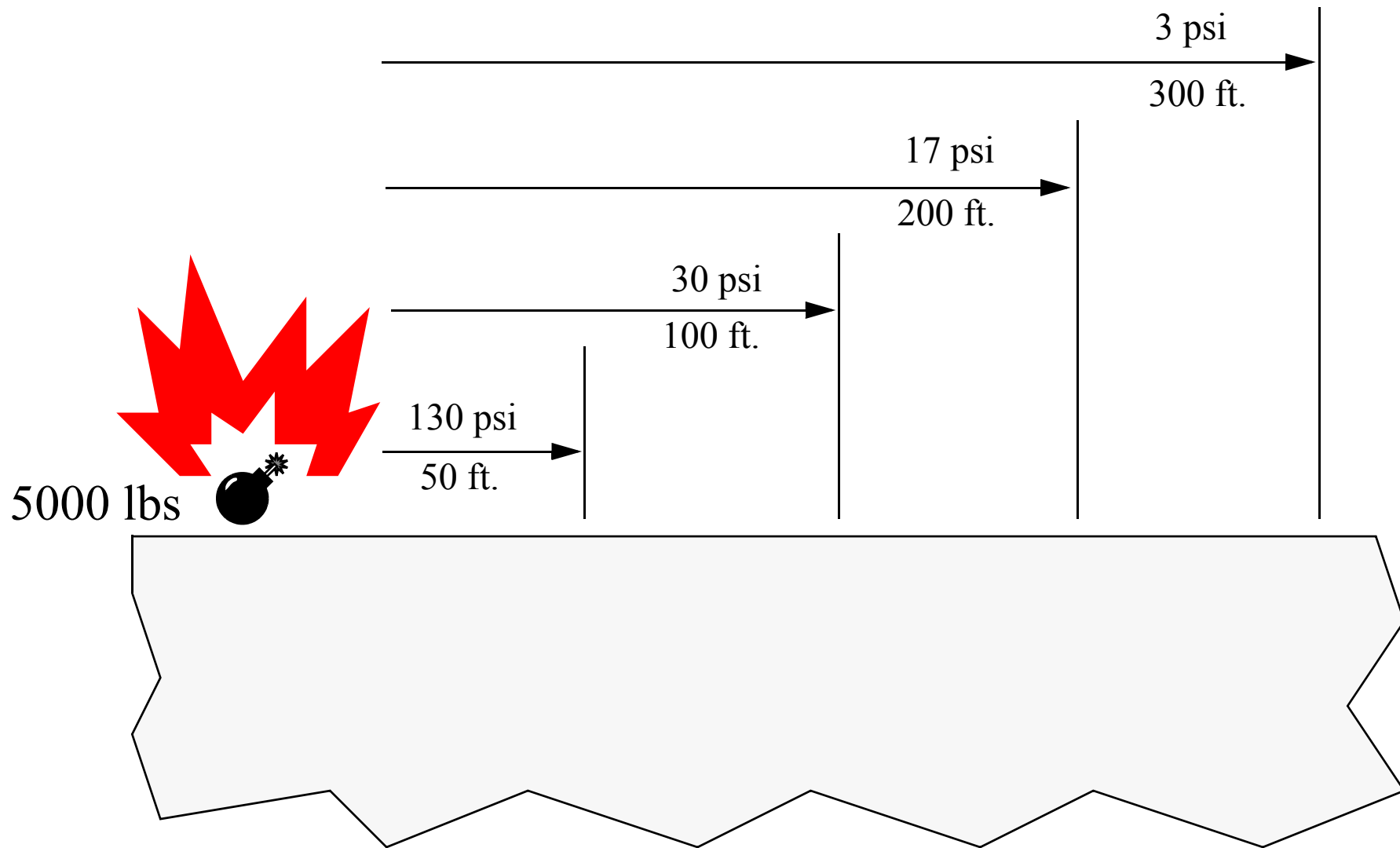
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The fundamental objective is to keep a bomb-laden vehicle away from your facility - distance is your best ally

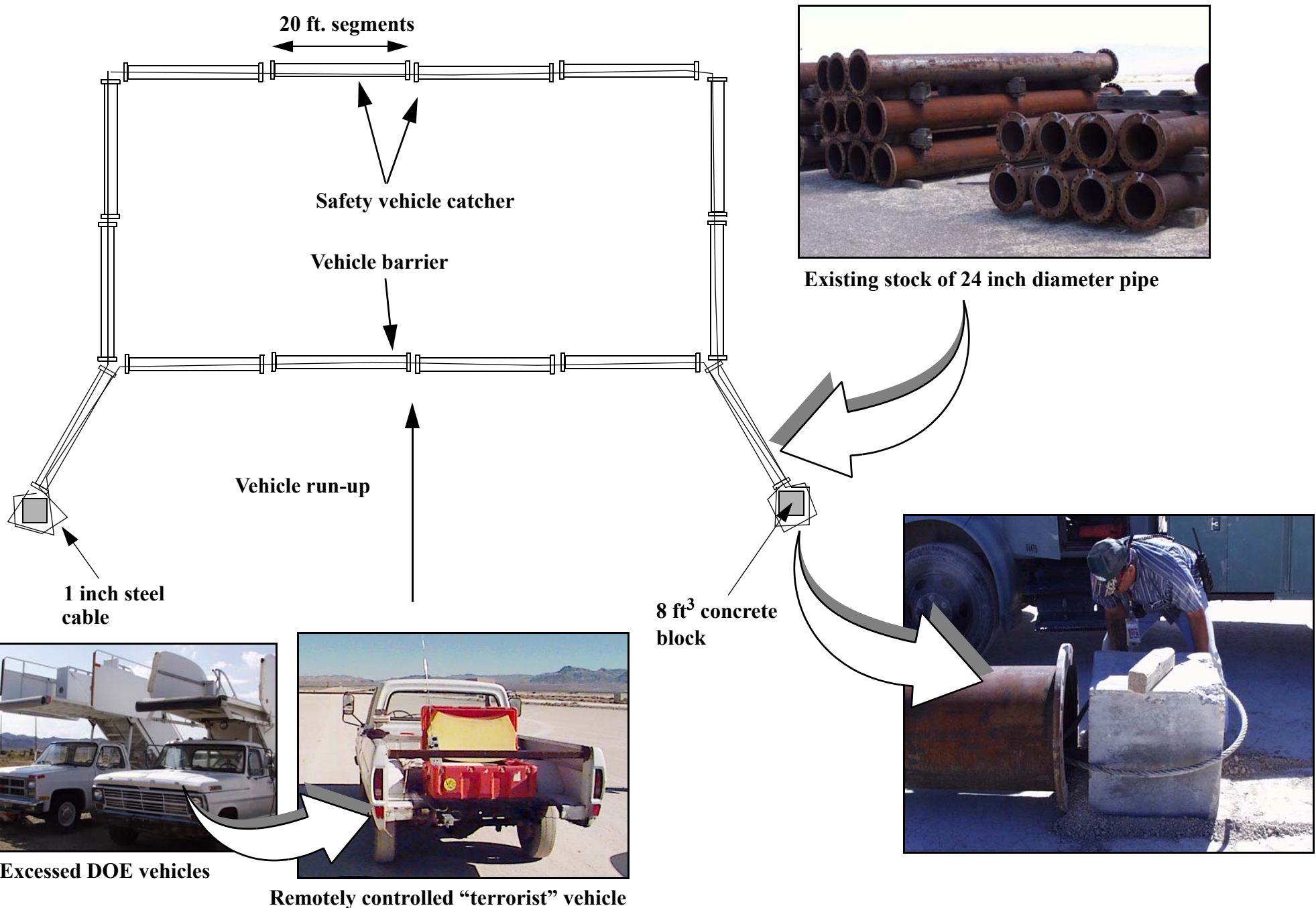


A vehicle test-bed was constructed at the Department of Energy Nevada Test Site



Vehicle run-up at the Hazardous Material Spill Facility

One of the principal objectives is to allow construction with readily available materials rather than specialized components



A four tier system was developed to ensure any vehicle progressing down-range could be safely brought to a dead stop



➡ Ignition system kill button on radio control box

➡ “Time-out” timer under hood for ignition system kill

➡ Accelerometer triggered ignition kill on impact

➡ Minimal fuel on board for fuel run-out



Two heavy-duty trucks were fitted for remote control



Joystick
box



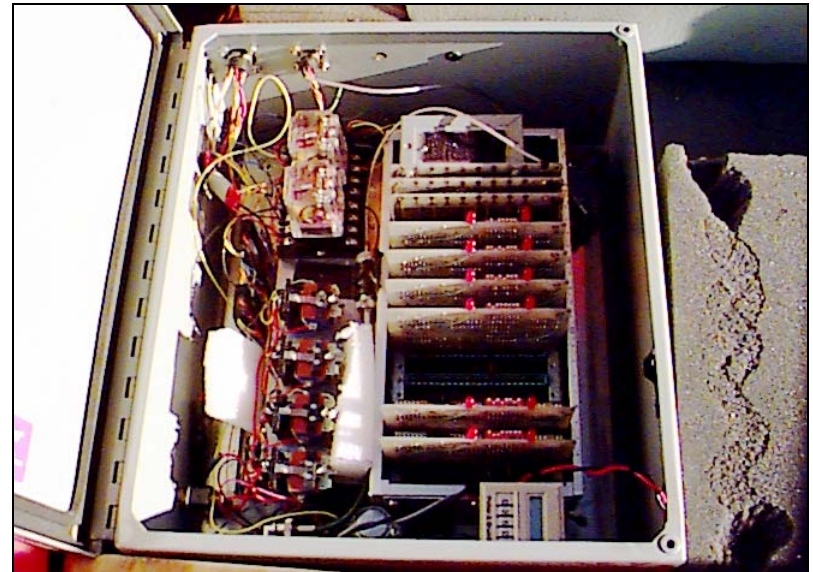
3/4 ton Ford truck



1 ton GMC truck



**Servos and linkages for accelerator
brake and steering wheel**



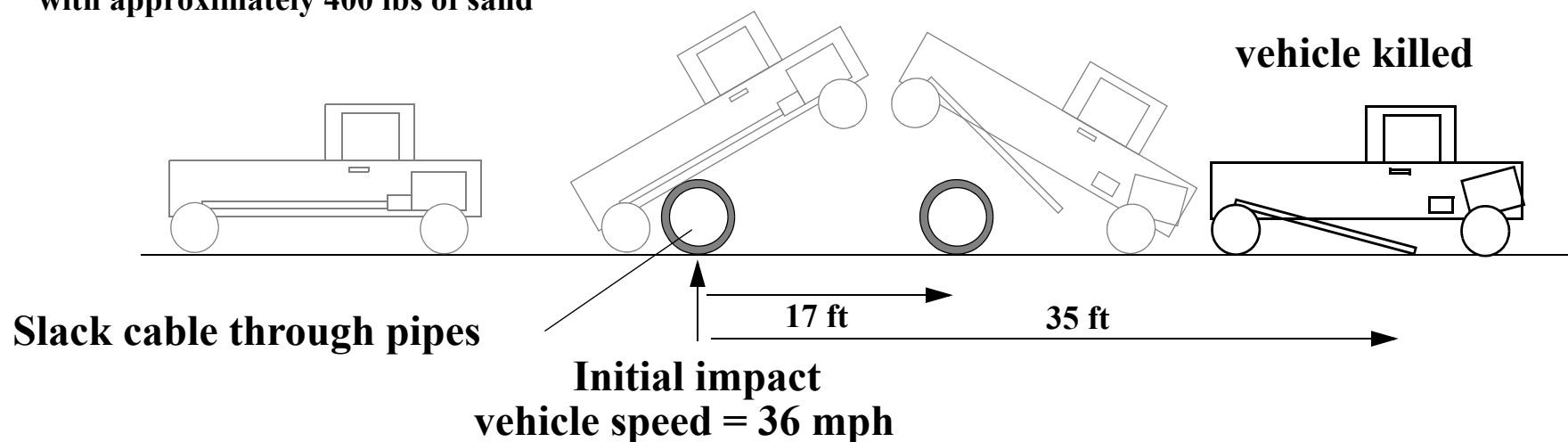
Electronic brain

Two experiments were performed with the vehicles



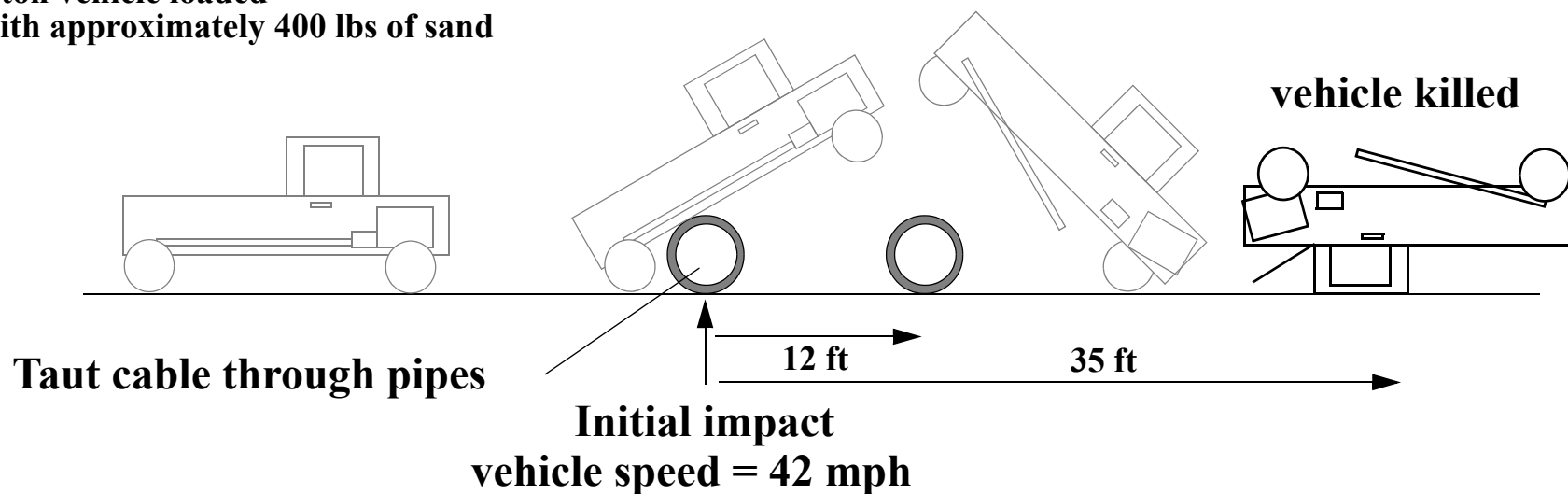
Test #1, October 1, 1998

3/4 ton vehicle loaded
with approximately 400 lbs of sand



Test #2, October 7, 1998

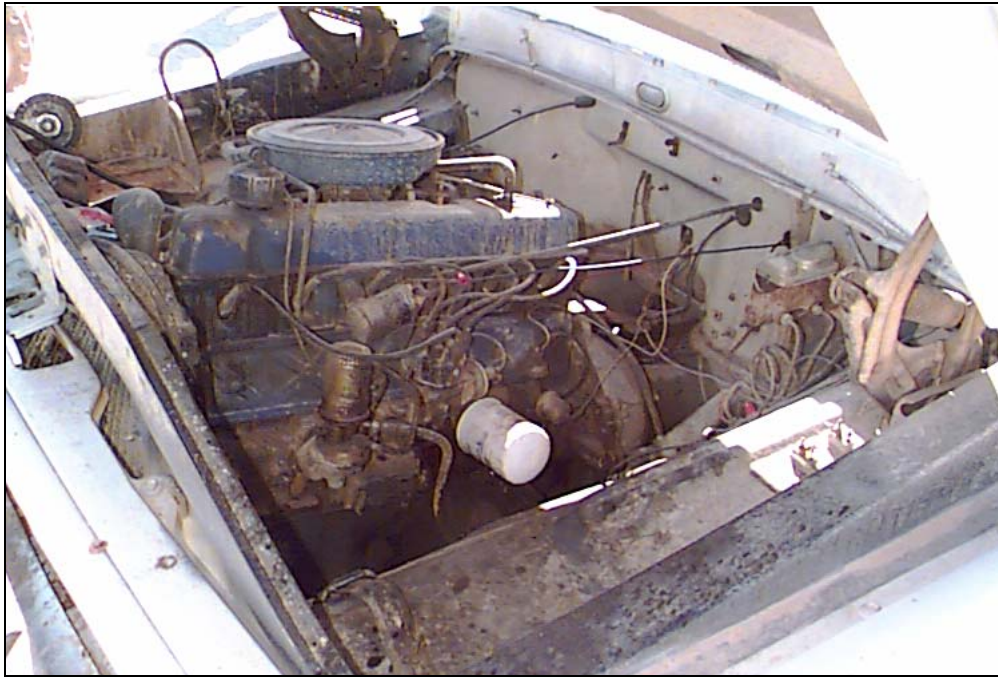
1 ton vehicle loaded
with approximately 400 lbs of sand



In the 2nd test on October 7, the truck power train was destroyed and the vehicle flipped



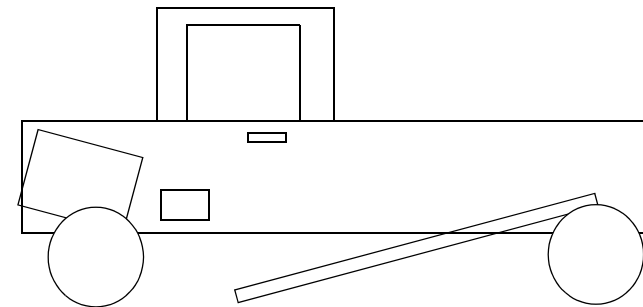
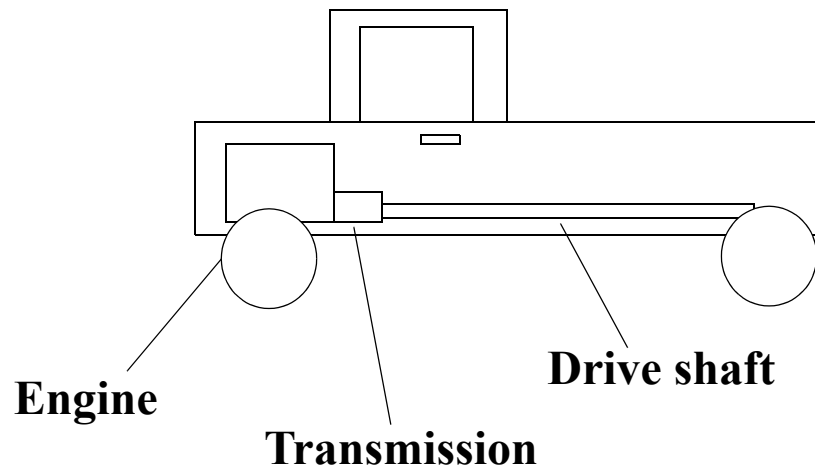
In both tests, the vehicle power trains were destroyed



Engine shears off motor mounts

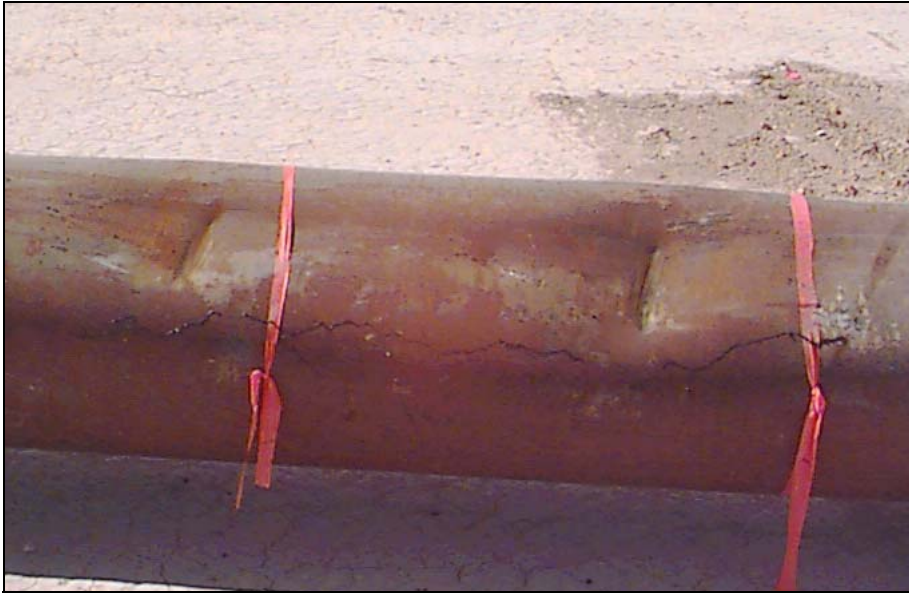


Drift shaft pulled out and bent



Power train destruction

The barrier system deforms but sustains very little damage



October 1 test (slack cable)

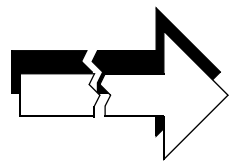


October 1 test (slack cable)

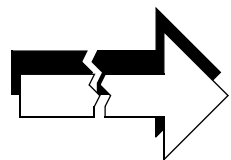


October 7 test (taut cable)

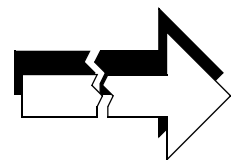
Conclusions based on the two experiments



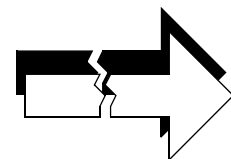
A pipe and cable barrier can be very effective in destroying an incoming speeding vehicle



The relative flexibility of the barrier allows the barrier to deform during impact, the result being a tough structure which is very difficult to break



For some facilities, this barrier could be erected NOW to significantly enhance security



The basic mechanics of the barrier works, we need to address potential architectural considerations to make the barrier attractive in public locations